

KEY TO THE NEARCTIC SPECIES OF PARACALOCORIS. (HETEROPTERA; MIRIDÆ).

By W. L. McATEE.

The genera *Calocoris* Fieber and *Paracalocoris* Distant are very closely related if indeed they are not identical. They belong to the sub-family Mirinæ and to the tribe Capsini. In these insects the body is not constricted at middle, the cheeks are narrow, hind femora slender, pile of first antennal joint not dilated apically, first joint of tarsus short, last two joints of antennæ distinctly slenderer than second, and the head as seen from side about as long as high at base.

The characters thus far advanced for separating *Paracalocoris* from *Calocoris* are not constant, and the writer must leave to someone having ample material of the latter, the problem of ascertaining whether the two groups really are generically distinct. As used in this paper *Paracalocoris* includes species having the characters above outlined and in addition the following: Pronotum with two discal, subexcavated, velvety black spots, and left clasper of male with a large rounded or pointed lobe on upper side at base. In *Calocoris* as represented by *alpestris* Meyer, *fulvomaculatus* DeGeer, and *norvegicus* Gmelin; the clasper has no such lobe at base, and in the last-named species is much slenderer throughout.

Species that have been referred to *Paracalocoris*, probably erroneously, include two described by Herrich-Schaffer. One of these, *Capsus tetrastigma** has been placed in *Resthenia* by Stal.† The other, *Capsus externus*,‡ in the writer's opinion, is not a *Paracalocoris*. It is true that the two central velvety black spots on the thorax mentioned in the original description suggest that the insect is a member of this genus, but no *Paracalocoris* has the first antennal joint "as long as head and thorax together," a condition plainly stated in the description and delineated in the illustration of *Capsus externus*. If the

*Die wanzenartigen Insecten. Bd. 9, Nurnberg, 1853, pp. 166-167.

†Hemiptera mexicana enumeravit speciesque novas descripsit. Entomologische Zeitung (Stettin). Jahrgang 23, Nr. 7-9, July-September, 1862, p. 317.

‡Wanz. Ins. 8, 1848, p. 16.

statement regarding the antenna is correct, *C. externus* does not belong to the genus now under consideration. If incorrect and the species really is a *Paracalocoris*, it may be closely related to *P. scrupeus* var. *bidens* n. var., or to *P. limbus* n. sp. From the former, it would be at least varietally distinguished by the four-lobed black marking across posterior part of thorax and from the latter by the scutellum being pale reddish instead of fuscous.

In preparing the key to *Paracalocoris* the writer strove to base it entirely upon fairly constant structural characters and was successful except for the *colon* group. This section is considered to consist of three species, and color pattern is used as a key character. The dangers of the latter course are well illustrated by the several distinct color patterns exhibited by the varieties of *P. scrupeus*, but which nevertheless are practically identical structurally. The writer is convinced that basing classification upon structure, so far as possible is an ideal distinctly worth while. Could it be consistently applied the experience of the student of systematic entomology would be much more satisfactory.

For the loan of material the writer is indebted to Messrs. J. C. Crawford, Otto Heidemann, W. D. Pierce, Wm. T. Davis and H. H. Knight. Mr. Knight kindly gave me for inclusion in this paper descriptions of the new species *hawleyi* and new variety *ancora*, forms upon which he had made economic investigations in New York and which he had already determined as undescribed.

The key includes the following species and varieties:

<i>Species</i>	<i>Old</i>	<i>New</i>	<i>Varieties</i>	<i>Old</i>	<i>New</i>
10	6	4	26	3	23

With regard to varieties, the writer would remark that placing together in a collection the often very distinct appearing color varieties results in a heterogeneity that inevitably suggests that classification has not been properly done. The use of names for the varieties not only encourages separation of them in collections but facilitates reference to them and is one of the steps necessary to a better understanding of their significance.

KEY TO SPECIES.

- A. Hind tibiae with long hairs standing out all around, obscuring tibial spines.....1. *scrupeus* Say.
- AA. Pilosity of hind tibiae more appressed, especially on inner side; not so abundant and spreading as to obscure spines.
 - B. First antennal joint as long as, or longer than thorax.
 - C. Greatest width of thorax over 2 mm., color everywhere except discal spots and membrane a lighter or darker reddish brown..2. *adustus* n. sp.
 - CC. Greatest width of thorax under 2 mm., coloration not as above,
 - 3. *hawleyi*, H. H. Knight, n. sp.
 - BB. First antennal joint shorter than thorax.
 - D. Upper surface polished, very sparsely haired.
 - E. Second antennal joint considerably less than 2 mm. long.
 - 8. *jurgiosus* Stal.
 - EE. Second antennal joint considerably more than 2 mm. long.
 - 10. *deleticus* Reuter
 - DD. Upper surface not polished and with numerous hairs.
 - F. Second antennal joint 2.4 mm. long or longer.
 - G. Thorax 2.3 mm. wide.....4. *limbus* n. sp.
 - GG. Thorax less than 2 mm. wide.....9. *acceptus* n. sp.
 - FF. Second antennal joint 2.2 mm. long or less.
 - H. Color yellow-brown to brown, the principal markings consisting of 11 symmetrically arranged pale yellow patches, of which a usually conspicuous and always distinguishable one covers the apical third of scutellum.
 - 7. *multisignatus* Reuter.
 - HH. Color pattern not as above.
 - I. Color pattern when fully developed, consisting of pale golden longitudinal vittae (the longest following cubitus to apex of corium) upon rich mahogany red ground; the insect may be almost wholly pale golden, but the apex of corium never has a distinct dark marking...6. *heidemanni* Reuter.
 - II. Color pattern not as above; the whole insect may be fuscotramineous, but the apex of corium (just inside cubitus) always has a distinct fuscous to piceous marking.
 - 5. *colon* Say.

1. *Paracalocoris scrupeus* Say.

C. [apsus] scrupeus Say, * Descriptions of new species of Heteropterous Hemiptera of North America, New Harmony, Indiana, December, 1831, p. 22.† The complete writings of Thomas Say on the entomology of North America, Vol. I, 1859, pp. 342-343. (United States).

This species is distinguished from all the other Nearctic forms by the character of the pilosity of the hind tibiae. The abundant long hairs on this part of the leg stand out in all directions and almost completely conceal the tibial spines. The presence of spreading hairs on the *inner side* of hind tibia especially is diagnostic, since in other species the pilosity of the

*References are given in full the first time cited and abbreviated thereafter.

†Pagination of this paper according to Banks, N., Catalogue of the Nearctic Hemiptera-Heteroptera, 1910, p. 47.

inner side invariably is appressed. In specimens having the pile of hind tibiae mostly rubbed off, the presence of a few *outstanding* hairs on *inner* side of tibiae usually is sufficient indication that the specimen belongs to the *scrupeus* group.

Measurements:.* Total length 6–7.5 mm.; width of thorax across front .7–.73 mm., across posterior angles, 1.73–2.3 mm., length of thorax (seen from side) 1.16–1.6 mm.; length of antennal joints; first, 1.6–1.63 mm., second 1.9–2.66 mm., third .7–.9 mm., fourth .83–.9 mm.

Range: The specimens examined came from the region marked off by the following states: New York, North Dakota, Texas and Virginia.

Paracalocoris scrupeus divides into numerous color varieties, of which those seen may be separated as follows:

- a. Costal margin of hemelytra of about the same color as disc of corium; cuneus sometimes dusky red.
- b. Thorax with dark markings in addition to the discal spots.
- c. Thorax with typical dark markings, that is: portion anterior to discal spots or less piceous or only dusky, and usually piceous dots or more or less dusky clouding near posterior angles.
- d. Corium fusco-piceous.....var. *scrupeus* Say.
- dd. Corium dark red, cuneus a little lighter.....var. *rubidus* n. var.
- cc. Thorax otherwise marked.
- e. Thorax very dark.
- f. Scutellum mostly yellowish or reddish; thorax all dark above except for a median and two lateral areas in line with the discal spots.....var. *triops* n. var.
- ff. Scutellum dark.
- g. Scutellum piceous; thorax with two lateral yellow areas.
var. *diops* n. var.
- gg. Scutellum dusky with median light vitta, spots on clavus and corium yellowish red.....var. *delta* n. var.
- ee. Thorax all light, except for indistinct vittae and dusky maculations from discal spots to posterior margin, and between these and lateral margins; a broad pale vitta traversing scutellum, thorax and top of head; corium yellow brown.....var. *percursus* n. var.
- bb. Thorax without definite dark markings in addition to discal spots.
- h. Corium red-brown with yellow dots.....var. *compar.* n. var.
- hh. Corium except apex, and clavus except base and thin inner margin, uniform orange red; the extreme form of
var. *ardens* n. var.

*Intended to show merely the ordinary range of variation.

All measurements were taken with eye-piece micrometer in Zeiss binocular using No. 1 eyepieces and A-2 objectives, which combination yields a magnification of 20. The measurement, length of thorax, is taken with the insect viewed from side and is the direct length from upper front to upper hind margin, disregarding the curvature of dorsum. To have a definite point for beginning, the measurement of first antennal joint is always from constriction above basal knob.

- aa. Costal margin of hemelytra, at least the cuneus distinctly lighter in color than disc of corium.
 - i. Cuneus and sometimes spots on corium lighter in color than disc.
 - j. Thorax with typical markings (see c, above).....var. *cunealis* n. var.
 - jj. Thorax otherwise marked.
 - k. Thorax dark or dusky, with light vittæ from just outside discal spots toward posterior margin, and a light central patch sometimes prolonged toward hind margin.
 - l. Scutellum dark, with distinct median light vitta....var. *par.* n. var.
 - ll. Scutellum sordid or clouded yellowish.....var. *sordidus* n. var.
 - kk. Thorax except discal spots and anterior third, scutellum, cuneus and elytral maculations, pale yellow.....var. *lucidus* n. var.
 - ii. The whole costal margin reddish or yellowish.
 - m. Thorax without dark markings between discal spots and hind margin.
 - n. Discal boot-jack shaped area dark, bounded by lighter elytral margins, scutellum and thorax.....var. *bidens* n. var.
 - nn. This marking practically obsolete; upper surface except membrane, inner angle of corium and base and thin inner margin of clavus reddish or yellowish.....var. *ardens* n. var.
 - mm. Thorax with dark markings between discal spots and hind margin.
 - o. Typical dark marking on anterior third of thorax.
 - p. Scutellum dusky with median light vitta.
 - q. Clavus and adjacent parts of corium, and the membrane dusky.....var. *nubilus* n. var.
 - qq. Clavus and adjacent parts of corium spotted with yellowish red.....var. *delta* n. var.
 - pp. Scutellum mostly light; median light vitta, bounded by two more or less complete wedge-shaped dark ones; clavus and corium spotted with yellow.....var. *varius* n. var.
 - oo. No dark marking on anterior third of thorax..var. *bicolor* n. var.

Paracalocoris scrupeus var. **scrupeus** Say. (Loc. cit.)

Head in lightly marked individuals fuscous with pale yellow lineations medially above, over and under eyes and antennal sockets and across front of tylus; under surface of head pale yellow. All these markings may be more or less obscured by fuscous. Antennæ fusco-piceous, 3rd and 4th joints sometimes pale at base. Thorax and scutellum orange (orange chrome)* to pale red (jasper red); anterior third of thorax dusky to piceous, and dots or more or less clouding in same colors near posterior angles; scutellum more or less margined with dusky to piceous, median line often paler than ground color. Sides of prothorax with alternating pale and fuscous lines, usually connected by at least an oblique pale streak on meso and meta-thorax, to the pale markings along sides of venter.

Hemelytra fusco-piceous, tending in some specimens to show a reddish tinge, especially at the cuneus; membrane dusky.

Legs fusco-piceous, femora sometimes with pale yellow maculations and front and intermediate tibiae with one, hind with 2 pale annuli. Venter pale fuscous to piceous; lightly pigmented individuals have from one to three series of pale markings across outer parts of abdominal segments.

*When convenient, color names were taken from Color standards and color nomenclature,, by Robert Ridgway, Washington, D. C., 1912.

Batavia, N. Y., 19♂, ♀, June 20-27. On *Crataegus*, wild apple, and wild cherry. H. H. Knight. (K, M.)† A specimen without locality bears the label "on oak." (N. M.)

Niagara, N. Y., July 5, 1904, 1 ♀ (H.).

Beltsville, Md., June 9 and 14. 3 ♂ ♀ on *Psedera quinquefolia*. W. L. McAtee (M.). One of these specimens has intensified thoracic markings, and approaches var. *triops* (see below).

Bluemont, Va., July 1, 1914, 2 ♂. W. L. McAtee. (M.)

***Paracalocoris scrupeus* var. *rubidus* n. var.**

Head much as in typical variety; first joint of antennæ reddish testaceous to reddish and fuscous at base. Thorax and scutellum orange red (dragons blood red to Brazil red), dusky markings near posterior angles of thorax almost or quite obsolete.

Hemelytra chiefly dark red (morocco red), varying to piceous on clavus and apex of corium; costal edge of corium with small dull testaceous patches; cuneus blood red (garnet brown) to morocco red; membrane dusky.

Femora pale spotted and tibiae each with two light and three dark annuli, the terminal one of latter narrow; these markings sometimes obsolete.

Batavia, N. Y., June 28, 1914, 1 ♀, H. H. Knight, Type. (K.)
Stony Island, N. Y., July 8, 1896, 1 ♀ (N. M.).

***Paracalocoris scrupeus* var. *triops* n. var.**

Coloration as in typical variety except that thorax has much more extensive dark markings. A median area between discal spots, sometimes extending more or less toward hind margin and two areas just laterad of discal spots and continuing over sides, yellowish or reddish. Scutellum more heavily margined with piceous than in typical variety.

A pale (immature) specimen of this variety has the femora and basal joints of antennæ pale yellowish maculate.

A very dark specimen has discal thoracic marking reduced in size, and two triangular piceous markings bordering median line at base of scutellum.

Pine Island, N. Y., June 19, 1912. 1 ♀, Wm. T. Davis, Type (K.).

Staten Island, N. Y., June 17, 1912. 1 ♂ Wm. T. Davis, (H.).

1 ♀ without locality (N. M.).

†The initials in parentheses indicate present owners of specimens. Those used and their significance are as follows: D—Wm. T. Davis, H.—Otto Heide-mann, K.—H. H. Knight, M.—W. L. McAtee, and N. M.—U. S. National Museum.

Paracalocoris scrupeus var. **diops** n. var.

Coloration as in typical variety except that scutellum is entirely fusco-piceous, and thorax of same color except for yellow patches laterad of discal spots, which extend irregular projections toward hind margin. There are faint pale points also along median line.

1 ♂ Lakehurst, N. J., June 30. Wm. T. Davis. Type (H.)

Paracalocoris scrupeus var. **percursus** n. var.

A pale variety; head pale testaceous, an oval patch of dark herring bone markings between bases of antennæ, which is traversed by a pale vitta extending forward over tylus; patch on side of latter and stripe from front of eye to tylus shining light brown. Antennæ testaceous, first joint sprinkled with reddish brown or fuscous markings; second joint with same color varying in extent at base and apex; third and fourth joints more or less broadly tipped with same.

Thorax with a median percurrent area of varying extent pale testaceous; remainder of upper surface more or less fuscous irrorate or vittate.

Scutellum pale testaceous, median percurrent area clear; remainder with fuscous markings which tend to be arranged in two pairs of vitta, one set paralleling median clear area and the other lying on lateral margins of scutellum.

Hemelytra yellow-brown (hazel), clavus narrowly edged internally with black; cuneus yellowish red (rufous); membrane dusky with clearer areas.

General color beneath pale testaceous; the series of markings along sides which in the typical variety contrast with the ground color, here are of that color, but are set off by more or less fuscous edgings. Legs testaceous, fuscous irrorate.

In this variety the pilosity of hind tibiæ is rather sparse; the first joint of antenna also is consistently though slightly shorter than thorax; hence the variety is not so closely linked to *scrupeus* as are the others. For the present, however, it seems best to give it the status here assigned. The form is easily recognized by the broad pale marking percurrent over head, thorax and scutellum.

Plummers Island, Md., June 7, 1914, W. L. McAtee.
1 ♂ Type (M.).

Plummers Island, Md., June 30, 1907, A. K. Fisher. 1 ♂ (M.).

Four-mile Run, Va., May 31, 1914, Alex. Wetmore. 1 ♂ (M.).

District of Columbia, 1 ♀ (N. M.).

***Paracalocoris scrupeus* var. *compar* n. var.**

Head sordid-testaceous; area between bases of antennæ with faint fuscous herring-bone markings broken along median line. Antennæ: First joint, pale fuscous; second joint, apical third and narrow ring at base fuscous, remainder testaceous; third joint, apical third fuscous, remainder testaceous.

Thorax above sordid-testaceous in front of discal spots, elsewhere vinaceous red with indistinct paler areas. Scutellum reddish-fuscous with median reddish-yellow vitta. Corium red-brown with reddish-yellow spots; fuscous at apex. Clavus fuscous along inner margin. Cuneus clearer red-brown with clustered reddish-yellow spots. Membrane vitreous, dusky clouded.

Color beneath mostly reddish fuscous with reddish yellow markings. Legs sordid-testaceous; usual dark markings faintly indicated.

West Point, Nebr., June, 1888. 1 ♂, Type (N. M.).

This variety is almost a perfect match in color for some specimens of *P. colon* var. *colonus*.

***Paracalocoris scrupeus* var. *cunealis* n. var.**

This differs from typical variety only in always having the cuneus of a lighter color than disc or corium, that is yellowish to reddish; usually a few spots of the same color elsewhere on hemelytra, especially on the part next to cuneus. Basal part of cubitus also usually pale.

Batavia, N. Y., June 20 to July 6. Numerous specimens. H. H. Knight. On wild apple, *Crataegus* and *Quince*. (K, M.) 1 ♂, June 27, 1913 is the type. (K.)

Onaga, Kansas, 1 ♂, Crevecoeur. (N. M.)

***Paracalocoris scrupeus* var. *lucidus* n. var.**

Similar to last, but thorax except discal spots and part anterior to them, scutellum, cuneus, elytral maculations, and cubitus, pale yellow.

Batavia, N. Y., July 6, 1914. 1 ♀, H. H. Knight. Type (K.).

***Paracalocoris scrupeus* var. *par*.**

Head and antennæ as in typical variety.

Thorax above fusco-piceous except narrow yellowish-to reddish-orange vittæ beginning just outside discal spots and extending to near hind margin, a central patch of same color sometimes prolonged toward hind margin; and sometimes also smaller spots elsewhere. Scutellum fusco-piceous with more or less distinct yellowish to reddish orange median vitta; sometimes traces of two other vittæ midway between median one and basal angles. Hemelytra fusco-piceous; cubitus,

maculations (sometimes indistinct) near margin, especially toward cuneus yellowish to reddish yellow. Cuneus sometimes of same coloration, but varying to clearer reddish (Brazil red). Membrane dusky.

Legs with light markings rather pronounced. Coloration much like that of *P. hawleyi* var. *pallidulus* n. var.

Ithaca, N. Y., June 21, 1915. 1 ♂, Type (K.).

Same data, 1 ♀. Batavia, N. Y., June 20, 1915, 1 ♂.

Portage, N. Y., June 27, 1915. 1 ♂. All collected by H. H. Knight. (K, M.)

Rochester Jct., N. Y., June 16, 1914, 1 ♂. M. D. Leonard. (H.)

Willow Springs, Ill., July 3, 1904. 1 ♀. On wild grape. W. J. Gerhard. (H.)

West Point, Nebr., May 26, 1885. 1 ♀ and a ♂, with label Nebr. (N. M.)

***Paracalocoris scrupeus* var. *sordidus* n. var.**

Similar to variety *par*, the principal difference being that scutellum except the sloping lateral portions is sordid yellowish, paler along median line. The maculations of hemelytra are not so distinct as in *par* and the dark markings of thorax tend to be merely fuscous cloudings.

Batavia, N. Y., June 30, 1914. 1 ♂. H. H. Knight. Type (K.)

Nebraska, 1 ♂. (N. M.)

***Paracalocoris scrupeus* var. *bidens* n. var.**

Head and antennæ as in typical variety.

Thorax with typical markings, except that clouding near posterior angles may be absent. There are in some specimens traces of dark markings at middle of hind margin of thorax and on anterior median part of scutellum. Scutellum sometimes rather sordid with lighter median vitta. Otherwise, thorax, scutellum, and broad lateral portions of hemelytra, yellowish to red, brightest on cuneus; enclosing a discal boot-jack shaped fuscous to piceous area, which is sometimes invaded by pale maculations. Membrane dusky.

I group with this variety all specimens varying toward var. *ardens* (see below), but not clearly that form.

Beltsville, Md., June 14, 1914, on Virginia creeper, 1 ♂ Type. W. L. McAtee (M.).

Pine Island, N. Y., June 14, 1912, 1 ♂, and Staten Island, N. Y., June 17, 1 ♂. Wm. T. Davis (D.).

Batavia, N. Y., June 14 to 30, many specimens. On wild apple and *Crataegus*. H. H. Knight (K, M.).

Ithaca, N. Y., June 21, 1915. 1 ♀ and June 1911, 1 ♂. H. H. Knight (K.).

Lakehurst, N. J., June 30, 1 ♀; Singae, N. J., June 15, 1 ♂, and Ramsey, N. J., June 23, 1912, 1 ♀. Wm. T. Davis (D.).

Allegheny, Pa., no date, 1 ♀. (N. M.)

Beltsville, Md. Numerous specimens, June 9 and 14 and July 4. On *Psedera quinquefolia*. W. L. McAtee (M, K.).

Plummers Island, Md., June 5, 1903. 1 ♂, W. V. Warner (N. M.).

Washington, D. C., August 9, 1884. 1 ♂ (H.).

Bluemont, Va., July 1, 1914. On Virginia creeper. 2 ♀, W. L. McAtee (M.).

Victoria, Texas, April 11 and 20. On *Quercus virginianus*. 1 ♂, 1 ♀, J. D. Mitchell (N. M.).

One ♀, without locality, but with label, "on oak," June. (N. M.)

***Paracalocoris scrupeus* var. *ardens* n. var.**

Upper surface yellowish to reddish, practically without dark markings; faint dark markings tend to persist at apex of corium, along inner edge of corium and clavus and on vertex. Membrane smoky.

Willow Springs, Ill., July 3, 1904. On wild grape. W. J. Gerhard. 1 ♀. Type (H.)

Great Falls, Va., May 30, 1907. 1 ♀. O. Heidemann. (H.)

Chain Bridge, Md., June 9, 1905. 1 ♀. D. H. Clemons (N. M.)

***Paracalocoris scrupeus* var. *nubilus* n. var.**

Head and antennae as in typical variety.

Thorax above fuscous before discal spots, two widening fuscous vittae extending from discal spots to hind margin of thorax. Thorax elsewhere dusky vinaceous red, fading to yellowish just outside each discal spot and along median line behind.

Scutellum fuscous, fusco-piceous at base, reddish elsewhere with yellowish brown median vitta.

Clavus and adjoining parts of corium, and apex of latter fusco-piceous. Remainder of corium reddish, variegated with paler; cuneus clear light reddish, fuscous at apex. Membrane dusky with faint pale areas.

Portage, N. Y., June 21, 1914. 1 ♂ Type. H. H. Knight (K.).

Paracalocoris scrupeus var. **delta** n. var.

Head as in typical variety; antennæ, first joint, fuscous at base, testaceous sprinkled with reddish fuscous beyond; second to fourth each fuscous with a narrow testaceous annulus at middle, another at base.

Thorax above chiefly piceous; yellowish red to orange red sprinklings as follows: About discal spots and in three pseudovittæ toward hind margin, one outside each discal spot and one median, the latter diffuse; also a series of spots near hind margin.

Scutellum fusco-piceous with narrow orange-red median vitta. Clavus fusco-piceous sprinkled with reddish yellow along outer edge. Corium orange-red, spotted with yellow, fusco-piceous along cubitus and at apex. Cuneus clearer reddish with a few yellowish spots. Membrane dusky with large pale areas.

Color beneath fuscous to piceous the usual markings in yellowish and reddish; legs fuscous, femoral spots and tibial annuli testaceous.

Willow Springs, Ill., July 3, 1904, 1 ♀. On wild grape. W. J. Gerhard. Type. (H.)

Paracalocoris scrupeus var. **varius** n. var.

Head, antennæ and legs pale, but with the typical markings recognizable.

Thorax above reddish-orange, with transverse band in front of discal spots and broken vittæ from latter to hind margin, fuscous to piceous; sometimes sprinkled with pale fuscous or yellowish elsewhere.

Scutellum of same reddish-orange color or somewhat darker with paler median vittæ, set off by dark markings beginning at base and extending varying distances apically. Hemelytra of same ground color; clavus and apex of corium fuscous, sometimes fuscous cloudings elsewhere and usually yellow flecks paler than ground color. Cuneus clearer reddish. Membrane dusky with pale areas.

Batavia, N. Y., June 27, 1913. On wild apple. 1 ♀. Type. H. H. Knight (K.) Two other females with same data. (K, M.)

Paracalocoris scrupeus var. **bicolor** n. var.

Head rather pale, antennæ piceous, legs reddish fuscous.

Thorax above, reddish in front of discal spots, and between them, the latter marking extending toward hind margin, which is narrowly edged with reddish; remainder of upper surface fusco-piceous.

Scutellum dark red, lighter at base and apex.

Hemelytra fusco-piceous, except base of cubitus, narrow costal margin, apex of clavus and cuneus, which are dark red. Membrane fuscous.

Victoria, Texas, April 20. On live oak. 1 ♂. Type. J. D. Mitchell. (N. M.)

***Paracalocoris adustus* n. sp.**

Length 8 mm., length of thorax 1.46 mm.; width of thorax, front, .8 mm., back 2.2 mm.; length of antennal joints: first 1.6 mm.; second 2.53 mm.; third 1.16 mm.; fourth 1.1 mm.

Color an almost uniform reddish brown, a little lighter on cuneus and lower surface and inclining to fuscous on antennæ, tibiæ and inner margin of elytra; membrane dusky. Short pale yellow hairs abundant on upper surface, except membrane.

Lakehurst, N. J., June 13, 1908, 1 ♀ (Type), Wm. T. Davis (D.).

***Paracalocoris hawleyi* H. H. Knight, n. sp.**

Elongate and more slender than *P. colon*. Color, fusco-piceous to piceous, rubiginous in immature specimens, with outer margin of the hemelytra sordid hyaline or pale yellowish and cuneus reddish. Pubescence more sparse and not noticeably golden yellow, as in *P. colon*. Total length 6 mm.

♂. Head: Eyes and face dark brownish to black; posterior part of the eyes, a semicircular mark between and in front of the eyes, nearly joining across the vertex, pale to orange-red. Width of head across the eyes, 1.08 mm., width between eyes, .51 mm., length of dorsal aspect, .6 mm. Rostrum reaching to posterior margin of the hind coxæ, amber brown or fuscous, two basal segments more or less pale at apex; two apical segments darker. Antennæ: Segment I, length 1.37 mm., reddish black, densely hairy with a few scattering spines which stand out from the partly decumbent hairs; segment II, length 2.2 mm., thicker on apical half, brownish black with fine pubescence; segment III, length 1 mm., blackish, pale at the base, with very fine silvery pubescence; segment IV, length 1.19 mm., like the preceding, only slightly more slender.

Pronotum: Length 1.14 mm., width of base 1.88 mm., apex .82 mm.; color fusco-piceous, sometimes with apical half yellowish; front, sides and a very narrow margin extending around base of pronotum, pale; two jet-black, opaque, sub-excavated spots, one behind each callus, with a pale area bordering the outer margin of each. Scutellum fusco-piceous with a pale median, longitudinal line or trace thereof, some specimens having this line produced on the pronotum.

Hemelytra: Greatest width 2.02 mm.; clavus fusco-piceous as is that part of the corium inside of the cubital vein; corium exterior to the cubitus, pale yellowish, sometimes tinged with orange; cuneus reddish orange with basal and narrow outer margin paler; membrane and veins fuscous, with a clear spot along the margin near the apex of the cuneus.

Legs fusco-piceous, with small pale yellowish to reddish spots on the femora especially near the apices; hind tibia with two pale rings, sometimes not distinct, the larger taking up of the apical fourth; tarsi pale,

with the tips fuscous. Venter fusco-piceous, a series of 3 or 4 narrow pale lines on its margins in some specimens reduced to spots.

Female essentially the same as the male, but slightly more robust and especially so when filled with eggs. In typical specimens both sexes are of the same color.

Paracalocoris hawleyi var. **ancora** Knight, n. var.

Similar to *hawleyi*, but differs in having the hemelytra entirely fusco-piceous, cuneus dark reddish with the very apex fuscous; costal vein and base of cubitus noticeably pale; median longitudinal pale stripe of scutellum quite plain and is usually joined by a similar stripe extending from the base of the pronotum forward between the two sub-excavated black spots.

This species and variety are described from a large series of specimens collected on hop vines near Waterville, N. Y., from July 18th to September 1, 1914 and 1915. The writer has seen two specimens from Brookline, Mass.

The species is named for Mr. I. M. Hawley, who during the last two years has worked out the life history of the insect near Waterville, N. Y., where it is becoming a pest of economic importance on the cultivated hop. The life history of the species will soon be published by Mr. Hawley.

P. hawleyi and *P. colon* both may be distinguished from *P. scrupeus* and its varieties by the shortness of the pubescence on the posterior tibiae, which is never long and prominent enough to obscure the true spines. *P. hawleyi* differs from *P. colon* in being more slender and elongate; hemelytra more parallel-sided and in color, fusco-piceous with outer margin pale or reddish yellow; variety *ancora* with the hemelytra almost entirely fusco-piceous without the pale margin. The pubescence of *P. hawleyi* is more sparse and less golden yellow; dorsum not variegated with paler maculae as in the case in our local variety of *P. colon*. *P. hawleyi* feeds on hops and appears later in the season than *P. colon*. In 1915 the species began maturing about July 18th and adults continued to emerge up into the first week in August. Adults were most numerous from July 25 to August 20, while occasional adults are found in September. *P. colon* was found breeding in considerable numbers on the tender shoots of apple trees near Batavia, N. Y. In 1915 the first adult was taken June 19th and the majority of the species had emerged by July 7. Adults were very scarce by July 23 and none were taken after July 31.

The writer of the present paper desires to name two other color varieties of *Paracalocoris hawleyi*. These and the two described by Mr. Knight may be distinguished as follows:

- A. With lateral pale stripe whole length of corium.
- B. This stripe undivided, though it may contain a dark blotch especially at about middle of costal margin.....var. *hawleyi* Knight.
- BB. Stripe divided by a dark vitta broader posteriorly, leaving a very narrow pale costal margin.....var. *fissus* n. var.
- AA. Without such stripe.
- C. Hemelytra except cuneus almost uniform in color, though cubitus and costa may be pale.....var. *ancora* Knight.
- CC. Hemelytra and other parts of upper surface more or less spotted with yellow.....var. *pallidulus* n. var.

Immature specimens are reddish throughout, though the color pattern is indicated by different shades. Specimens nearly mature may be dusky red, but when fully mature the ground color of *hawleyi* is fusco-piceous to piceous.

***Paracalocoris hawleyi* var. *hawleyi* Knight.**

Waterville, N. Y., July 23, 1915, I. M. Hawley, 1 ♂ (Holotype) (K.).

Waterville, N. Y., July 27, 1915, I. M. Hawley, 1 ♀ (Allotype) (K.).

Waterville, N. Y., July 27 to August 18, 1915, I. M. Hawley, 3 ♂, 2 ♀ (K, M., N. M.).

Waterville, N. Y., July 7, 1913, G. W. Herrick, 4 ♂ (N. M., H.). These specimens are all immature and are very reddish. Another male with same date (H.) has thorax largely, costal stripe, tips of clavi and other pale markings ochreous and cuneus pale sanguineous.

Waterville, N. Y., August 5, 1913, I. M. Hawley, 1 ♂ (H.).

Beltsville, Md., June 14, 1914, W. L. McAtee, 4 ♂, 2 ♀ (M.).

***Paracalocoris hawleyi* var. *fissus*. n. var.**

Differs from *hawleyi* in having the pale costal margin divided by a mahogany red to fuscous streak from humerus to uncus suture. This streak, which is broader posteriorly, leaves only a thin pale costal streak and a wider but more irregular one along cubitus. Two specimens have a pale streak along claval vein, and a shorter one along brachial vein.

Beltsville, Md., June 14, 1914, W. L. McAtee, 1 ♂ (Type) (M.).

Same data also 3 ♀, 1 ♂ (M.).

Staten Id., N. Y., June 19, W. T. Davis, 1 ♂ teneral, and color not fully developed. (D.)

Paracalocoris hawleyi var. **ancora** Knight.

Waterville, N. Y., August 2, 1914, I. M. Hawley, 1 ♂, (Holotype) (K.).

Waterville, N. Y., August 21, 1914, I. M. Hawley, 1 ♀, (Allotype) (K.).

Waterville, N. Y., August 18-22, 1914, August 1-18, 1915, I. M. Hawley, 5 ♂, 1 ♀, (K, M., N. M.).

Waterville, N. Y., July 7, 1913, G. W. Herrick, 1 ♂, immature (N. M.).

Waterville, N. Y., August 5, 1913, I. M. Hawley, 1 ♂, (H.).

Ithaca, N. Y., upon hops, G. W. Herrick, 1 ♂, immature (H.).

Batavia, N. Y., July 15, 1913, June 24 to July 26, 1914, July 27-31, 1915, H. H. Knight, 6 ♂, 1 ♀, (K, M.).

Beltsville, Md., June 14, 1914, W. L. McAtee, 4 ♂, (M.).

Paracalocoris hawleyi var. **pallidulus** n. var.

Agrees with *ancora* in lacking broad pale costal margin, but differs from that variety in having the corium especially posteriorly, and usually the scutellum and thorax, dotted with small pale yellowish spots in addition to the usual pale markings.

Batavia, N. Y., June 24, 1914, H. H. Knight, 1 ♀, Type (K.).

Same locality, July 25, 1913, June 30, 1914, July 25 and 30, 1915, H. H. Knight, 3 ♀, 1 ♂, (K, M.).

Paracalocoris limbus n. sp.

Length 7.5 mm.; length of thorax 1.56 mm., width of thorax: Front, 1 mm., back 2.33 mm.; length of antennal joints: First 1.5 mm., second 2.56 mm., third 1.16 mm., fourth 1.33 mm.

Top of head, a marking on base of thorax, with anterior lobes reaching discal spots, and shorter lobes outside of these, scutellum and hemelytra except broad exterior margins fuscous; membrane dusky. Remainder of upper surface yellowish red, palest on edge of corium, deepest on front of thorax. First joint of antenna piceous, with copious coarse hair of same color; color of remaining joints and pubescence thereof successively paler, the third being fuscous, and the fourth testaceous with abundant, fine whitish hair.

Legs fusco-piceous, spots on femora and the tarsi pale. Under surface yellowish red with fuscous markings.

Clayton, Ga., 2000-3700 ft., June, 1909, 1 ♀ (Type), Wm. T. Davis, (K.).

Paracalocoris colon Say.

C. [apsus] colon Say, Heteropterous Hemiptera of North America, New Harmony, Indiana, Dec., 1831, p. 25. Complete writings, Vol. I, 1859, pp. 346-347. (Indiana).

It is not absolutely certain that the name *colon* is applied here to the precise form described by Say. For instance, Say describes the second antennal joint of *colon* as "whitish in the middle and for a short space at base, and blackish at tip." As color characters go in *Paracalocoris* those of the antennæ are perhaps the most constant. Yet in all the specimens, I have examined of what is here accepted as the *colon* group, not one agreed with the original description in coloration of the second joint of the antenna. *Paracalocoris multisignatus* Reuter, however, agrees perfectly in this particular and is the only species having just that coloration. Nevertheless the remainder of the description of *colon* does not fit *multisignatus*, and in particular the conspicuous pale spot invariably present on apical third of scutellum of the latter species is not mentioned. This could hardly be overlooked. In the absence of type specimens, therefore it is best to preserve the names as they are customarily applied. It is possible, futhermore, that a specimen of the typical variety with proper antennal coloration may sometime be found, in which case all doubts will be removed.

Description of Nymphs.

Two nymphs evidently of this species, collected at Beltsville, Md., June 9, 1915, on *Psedera quinquefolia*, W. L. McAtee (M.), may be characterized as follows:

Length 4-4.5 mm.; length of thorax .66 mm.; width of thorax: front .703-.806 mm.; back 1.2 mm.; distance from back of thorax to tip of wing pad 1.6 mm.; length of antennal joints: first 1 mm.; second, 1.8 mm.; third .8-1 mm.; fourth .806 mm.

General color, yellowish green or sordid testaceous, fusco-piceous on tips of wing pads, and sometimes on head. Antenna: first joint light greenish to reddish, with copious black pile; second joint, basal two-fifths, stramineous, remainder reddish, varying to piceous, with copious black pile, more abundant apically; third joint greenish, apical third blackish, also with longer and more copious pile than usual; fourth joint pale. Femora when marked, reddish or fuscous with yellowish spots; tibiæ with two dark and two pale annuli; tarsi dark at tip.

Paracalocoris colon may be divided into color varieties as follows:

- A. Hemelytra entirely pale (stramineous to reddish) or with markings (besides that at apex of corium) darker than ground color.
- B. Hemelytra pale, with conspicuous dark spots or cloudings. . var. **colon** Say.
- BB. Hemelytra practically unicolorous pale. var. **castus** n. var.
- AA. Hemelytra entirely dark (reddish-brown to blackish-fuscous) or with markings lighter than ground color.
- C. Thorax varying from reddish to fuscous or fuscous clouded or vittate; thorax usually, and hemelytra always more or less spotted with pale yellow. var. **colonus** n. var.
- CC. Thorax as in last variety; hemelytra almost or entirely lacking yellow spots. var. **amiculus** n. var.

Paracalocoris colon var. **colon** Say (Loc. cit.)

Length 7 mm.; length of thorax 1.46 mm.; width of thorax: front .83 mm.; back 2.2 mm.; length of antennal joints: first 1.2 mm., second 2.13 mm., third .86 mm., fourth .7 mm.

Ground color stramineous to testaceous; plentifully pilose with short white to golden hairs.

Head with faintly indicated herring bone pattern, interrupted along median line, sometimes with dusky clouding above. Antennæ testaceous, the basal joint somewhat reddish; narrow annulus at base and apical third of second joint, piceous; third and fourth each darker toward apex.

Thorax with following fuscous markings: spots near anterior angles or transverse band behind stricture, widening vittæ from discal spots to posterior margin, and vittæ along lateral margin outside of former pair, the two sometimes merged.

Scutellum with fuscous mark near base and indications at least of narrow median pale vitta. Clavus within, irregular blotches on corium near clavus, on middle of costal part of corium, apex of corium and apex of cuneus, fuscous. Membrane vitreous with fuscous clouding. Lower surface variegated with ground color and fuscous, the latter covering most of the genital segment and under surface of thorax. Legs with pale fuscous to fusco-piceous irrorations near apices of all femora and near bases of hind femora; traces at least of two dark and three light annuli on tibiæ; tarsi dark apically.

Staten Id., N. Y., June 17, 1 ♂ (H.) and 1 ♀ (D.), Wm. T. Davis.

Paracalocoris colon var. **castus** n. var.

Length 5.5-7 mm.; length of thorax 1.5-1.6 mm.; width of thorax: front .8-.9 mm.; back 1.5-1.6 mm.; length of antennal joints: first .83-1 mm.; second 1.93-2.06 mm.; third .8 mm.; fourth 1 mm.

The color varies from sordid stramineous to light reddish-brown. There are no distinct markings on head or body above besides discal spots on thorax and dusky to piceous spots on apex of corium and dusky or clouded membrane. The cuneus varies from stramineous spotted

with reddish-yellow to clear reddish. Antennæ as in typical variety sometimes paler, last joint sometimes almost wholly fusco-piceous. Legs and under surface as in typical variety but lighter.

Beltsville, Md., July 4, 1915. On *Psedera quinquefolia*, W. L. McAtee, 1 ♀, (type), (M.).

Haverstraw, N. Y., July 4, 1897, 1 ♀, (N. M.).

Staten Id., N. Y., August 17, W. T. Davis, 1 ♂, (D.).

Beltsville, Md., June 14, 1914, 1 ♀, W. L. McAtee, same date as type, 4 ♀, 1 ♂, W. L. McAtee, (M.).

Washington, D. C., June 23, 1905, 1 ♂, 1 ♀, O. Heidemann (H.).

Illegible locality, 2 ♀, (N. M.).

***Paracalocoris colon* var. *colonus* n. var.**

Length 5.5-7 mm.; length of thorax 1.1-1.4 mm., width of thorax: front .76-.96 mm.; back 1.76-2.1 mm.; length of antennal joints: first .93-1 mm.; second 2.06-2.2 mm., third .8-.806 mm.; fourth .903-1 mm.

Head testaceous, with usual herring bone pattern and some blotches, pale fuscous to fuscous; eyes reddish testaceous, blotched or clouded with same color. Antennæ about as in typical variety, first joint in particular sometimes darker. In distinctly marked forms first joint may be yellowish spotted, and pale yellowish part of second joint broken by a wide pale fuscous band.

Thorax red-brown to fusco-piceous or with clouding or more definite transverse marking behind apical stricture, and broad vittæ from discal spots to hind margin fuscous or fusco-piceous. Area laterad of these vittæ sometimes also of same color. Areas in front of and sometimes surrounding discal spots, spots along median line and often elsewhere, yellowish-testaceous.

Scutellum fuscous to fusco-piceous, usually with median vitta or traces of it at least apically, extreme apex, and submarginal vittæ or traces thereof pale yellowish.

Hemelytra reddish-brown to fusco-piceous with scattered pale yellowish spots (tending to be longitudinally elongate), especially numerous near and in cuneus. In extreme forms these agglomerated into patches along cubitus; clavus usually only slightly marked. Cuneus more reddish than any other part of hemelytra. Membrane vitreous with fuscous clouding to almost black; apex of corium fuscous to fusco-piceous.

Legs more heavily marked than in preceding varieties; femora irrorate with or largely reddish to fusco-piceous, spotted with yellowish; tibiæ also yellow spotted and tending to have two dark and two pale annuli; tarsi darker toward tips. Under surface variegated with yellowish and fuscous; three dark and two light bands on side of head, under side pale fuscous; sides of prothorax with 2 narrow pale bands, each bordered on both sides by darker color, the lower at least repre-

sented by a distinct yellowish, fuscous-bordered spot, above insertion of front leg; a pale vitta across side of meso- and meta-thorax, and a series of about three dark and three pale bands on sides of abdominal segments. These markings may be traced in dark specimens of the other varieties of colon.

Rather a heterogenous assemblage, but on account of overlapping variations not easily divisible into smaller groups.

Well-marked dark specimens of this variety answer well to the description of *Paracalocoris attenuatus Distant**, but in the absence of authentic specimens of that form, it is preferable to use a different name. If the two forms are later found to be identical, the fact can easily be indicated.

Bluemont, Va., July 1, 1914, W. L. McAtee, 1 ♂ (Type) (M.).

Middlebury, Vt., July, 1912, 1 ♂, (K.).

Haverstraw, N. Y., July 4, 1897, 3 ♂, (N. M.).

Lancaster, N. Y., August, 1886, 1 ♀, (N. M.).

Greensburg, Pa., July 25, 1 ♀, M. Wirtner, (H.).

Lake Hopatcong, N. J., July 4, 1913, 1 ♀, W. T. Davis, (K.).

Trenton, N. J., 2 ♂, (H.).

Beltsville, Md., June 14, 1914, 2 ♂, July 4, 1915, on *Psedera quinquefolia*, 1 ♂, W. L. McAtee, (M.).

Bluemont, Va., July 1, 1914, W. L. McAtee, 2 ♂, (M.).

Paris, Fauquier Co., Va., July 27, 1890, on wild grape, O. Heidemann, 1 ♀, (H.).

Missouri, C. V. Riley, 1 ♀, (N. M.).

Ft. Collins, Colo., July 21, 1899, E. D. Ball, 3 ♀, 2 ♂, (N. M., H.).

***Paracalocoris colon* var. *amiculus* n. var.**

Similar to last, but hemelytra almost or entirely lacking yellowish spots. Cuneus reddish, usually more or less yellowish spotted, membrane and apex of corium dusky to black. Legs and antennæ darker than in last variety.

Beltsville, Md., July 4, 1915. On *Psedera quinquefolia*, W. L. McAtee, 1 ♂, (Type) (M.). Same data, 1 ♀, (M.).

Plummers Id., Md., June 17, 1906, W. L. McAtee, 1 ♂, (M.).

*Biologia Centrali-Americana. Insecta, Rhynchota, Hemiptera-Heteroptera, Vol. I, p. 264, Feb., 1884 (San Geronimo, Gautemala; Bugaba, Panama).

***Paracalocoris heidemanni* Reuter.**

Paracalocoris heidemanni Reuter, O. M. Bemerkungen über nearktische Capsiden nebst beschreibung neuer Arten. Acta Societatis Scientiarum Fennicae, 36, No. 2, 1909, p. 40. (Aurora, W. Va., August 19, 1904,* O. Heidemann).

Length 6-7 mm.; length of thorax 1.23-1.3 mm.; width of thorax: front .66-.73 mm.; back 1.8-1.93 mm.; length of antennal joints: first 1-1.16 mm., second 1.93-2.06 mm., third .9-.93 mm., fourth .96-1.06 mm.

Range: The known range comprises only Maryland, Virginia and West Virginia.

Two color varieties may be distinguished as follows:

- A. Vitta overlying cubital vein contrasting decidedly in color with adjacent parts of corium.....var. *heidemanni* Reuter.
 AA. Corium practically uniform in color.....var. *ablutus* n. var.

***Paracalocoris heidemanni* var. *heidemanni* Reuter. (Loc. cit.)**

The form described below must be regarded as the typical variety, although Reuter's description of the ground color of hemelytra as fusco-testaceous or isabelline, by no means suggests the rich mahogany-red color of most of the specimens.

Fully colored specimens are as follows: Head reddish testaceous, with herring bone pattern on vertex in a darker red brown; eyes piceous. Antennæ dark red-brown, first joint sprinkled with yellow, and as a whole with the following piceous markings: Extreme apex of first joint, narrow basal annulus and apical half of second; apical 4-5 of third and fourth joints.

Ground color of upper parts a rich mahogany red, deepest on corium, with the following yellow or golden markings; thorax anterior to apical stricture, a median vitta and two others just outside discal spots extending to and broadening at posterior margin of thorax; narrow median and broader marginal vittæ on scutellum; streak on corium, bordering basal half of clavus, clavus along commissure, vitta along cubitus to apex of corium, narrow costal margin and sometimes a small isolated spot at center of apical margin of corium. Cuneus somewhat deeper in hue than ground color of corium. Membrane dusky, with paler areas and pale reddish vein. Legs pale reddish, femora yellow spotted. Under surface marked with yellow and mahogany red; a series of two dark and three light stripes along side of thorax and about three dark and four light, interrupted vittæ on sides of body segments.

In the paler specimens that may be said to have cubital vittæ, the ground color is yellow-brown to which the cuneus retaining its reddish cast is in distinct contrast.

*Should be August 16.

Plummers Island, Md., July 19, 26 and August 9, 1914. On *Hypericum prolificum*. Numerous specimens. W. L. McAtee, (M.). August 4 and 11, 1907, 1 ♀, 1 ♂, W. L. McAtee (H.).

Bladensburg, Md., July 6, 1906, 1 ♂, O. Heidemann, (H.).

Casanova, Va., August, 1912, 1 ♂, O. Heidemann, (H.).

Aurora, W. Va., August 22, 1904, 1 ♀, O. Heidemann, (H.).

***Paracalocoris heidemanni* var. *ablutus* n. var.**

This differs from the typical variety chiefly in the general paleness of the ground color, which so approximates that of the vittæ that the latter are scarcely or not distinguishable, especially those on hemelytra. The scutellar and thoracic markings usually are evident. The cuneus is paler than in typical form though still in contrast (pale reddish-brown) to ground color (light orange-yellow). Upper surface with abundant golden hairs as in typical variety. Vein of membrane whitish.

Plummers Island, Md., July 14, 1915. On *Hypericum prolificum*. 1 ♂, Type, W. L. McAtee (M.). Other specimens from same locality and date; also July 19 and 26. (M.)

Bladensburg, Md., July 6, 1906, 1 ♀, O. Heidemann, (H.).

Casanova, Va., August, 1912, 1 ♀, O. Heidemann, (H.).

Hypericum prolificum L. is the true food plant of *Paracalocoris heidemanni* in the vicinity of Washington, D. C., for upon it the nymphs are reared. Occurrence of the species is practically restricted to the flowering season of the p.ant.

The nymphs in my possession may be described as follows:

Total length 4 mm.; length of thorax, .86 mm., width of thorax, front .83 mm., back 1.6 mm.; distance from back of thorax to tip of wing pad 1.53 mm.; length of antennal joints, first .83 mm., second 1.46 mm., third .83 mm., fourth .8 mm.

Head and thorax sordid testaceous irrorated with reddish. First two joints of antenna rufo-fuscous with abundant coarse black pile. (Only the first joint is so haired in adult). First joint sometimes dotted with yellowish. Third fuscous, pale reddish at base; fourth testaceous to fuscous. Wing-pads sordid rufo-testaceous, these and remainder of upper surface with numerous soft white hairs. Dorsum of abdomen either reddish with a row of yellow dots across each segment, or yellowish with red dots. Legs reddish to fuscous, femora spotted with yellowish. Under surface reddish with yellow spots or the reverse.

Plummers Island, Md., July 14 and 19, 1915. W. L. McAtee, (M.).

***Paracalocoris multisignatus* Reuter.**

Paracalocoris multisignatus. Reuter. Acta Soc. Sci. Fennicæ, 36, No. 2, 1909, pp. 40-41 (Rock Creek, D. C., June 29, 1890, and Washington, D. C., June 22,* 1905. O. Heidemann).

Length 6-7 mm.; length of thorax 1.1-1.33 mm.; width of thorax, front, .56-.66 mm., back 1.63-1.93 mm.; length of antennal joints: first .93-1.06 mm., second 1.86-1.93 mm., third .9-.96 mm., fourth .9-? mm.

A specimen with the markings fully developed has the head reddish cream color, and the eyes stramineous flecked with piceous. The first joint of antenna is fuscous, pale at base; the second stramineous, with a reddish-cream annulus on second quarter from base and the apical quarter fusco-piceous; the last two joints have similar though more obscure markings.

Front and hind margins of thorax, vittæ from latter to discal spots, and band between these pale fuscous, interrupted by small amber yellow spots; leaving three large areas of amber yellow, one on each side extending down over side of thorax and a median sub-basal area.

A large amber yellow spot covers apical third of scutellum; a large spot of same color on cuneus, another just anterior to cuneus and a third midway between this and base of corium. Apex of clavus also amber yellow. Ground color between these areas pale fuscous to blackish brown, with small amber yellow spots. Membrane fumose with paler areas. Legs pale yellow, distal halves or less of femora, two annuli on tibiæ, and tips of tarsi fuscous. Undersurface amber yellow, with fuscous markings on sides of meso- and meta-thoraces, body segments near lateral margins, on middle of subgenital and edge of genital segments.

Principal variations in color are: First joint of antenna may be only fuscous spotted; large amber yellow spots may be obscured either by themselves becoming darker or the ground color paling so as to be almost as pale as the spots. Under surface sometimes wholly pale yellow.

Beltsville, Md., June 14, 1914, 1 ♀, July 4, 1915. On *Psedera quinquefolia*. 1 ♂, 2 ♀. W. L. McAtee, (M.).

Washington, D. C., June 7, 1884, 1 ♀, O Heidemann, (N. M.).

Hampton, Va., July, (K.).

Texas, 1 ♂, (N. M.).

***Paracalocoris jurgiosus* Stal.**

Calocoris jurgiosus Stal. Hemiptera mexicana enumeravit speciesque novas descripsit. Entomologische Zeitung (Stettin). Jahrg. 23, No. 7-9, July-Sept. 1862, p. 320 (Mexico).

Length 4.5-6.5 mm.; length of thorax 1.16-1.6 mm.; width of thorax: front .66-.73 mm., back 1.73-1.93 mm.; length of antennal joints: first .8-.93 mm., second 1.73-1.83 mm., third .7-.76 mm., fourth .7-.76 mm.

*Should be June 23.

This insect, while furnished with a considerable number of hairs on upper surface, particularly of corium, has a more polished appearance than usual in the genus. The smooth, shiny surface of head, thorax and scutellum is especially noticeable.

Head shining stramineous to reddish testaceous, herring bone pattern faintly indicated. Antennæ reddish testaceous, with following markings: First joint with yellowish spots; second with narrow annulus at base fuscous, one of equal width above it whitish, then about one-third of length of joint of ground color, followed by another narrow whitish annulus, the remainder (nearly half) of joint fusco-piceous; third and fourth joints tipped with fusco-piceous.

The ground color of thorax varies from reddish testaceous to fusco-piceous and the markings from stramineous to amber-yellow. The pattern of markings is as follows: Front margin of thorax a patch between discal spots, and one outside each of them, usually extending as vittæ toward posterior margin of thorax and narrow posterior margin of thorax; on scutellum a narrow median and two broader submarginal vittæ, sometimes broken into dots; on clavus a vitta each side of claval vein; on corium narrow costal margin, vittæ along costal cubital and brachial veins and one paralleling clavus, all usually more or less broken; cuneus with an irregular patch and two longitudinal vittæ. Membrane vitreous to dusky, usually with more hyaline areas and vein in part pale.

Under surface with same colors as upper, a series of 3-5 dark and 3-4 light markings along sides of abdomen; segments pale along posterior margins; a pale vitta underlined by a narrow dark one at top of lateral aspect of pronotum. Legs with same colors, femora banded at middle and sprinkled elsewhere with paler; anterior two pairs of tibiæ dark on basal third, pale elsewhere; posterior or tibiæ with two dark and two pale bands; tarsi fuscous apically.

Brownsville, Texas, June 6, 1895, E. A. Schwarz, 1 ♀.

Brownsville, Texas, June 1, 1907, on cotton. R. A. Cushman, 1 ♀.

San Antonio, Texas, April 18, 1908, W. D. Hunter & F. C. Pratt, 2 ♂, 2 ♀.

Sabinal, Texas, May 26, 1910, F. C. Pratt, 1 ♀.

Hondo, Texas, June 3, 1909, J. D. Mitchell, 1 ♀.

Neuces River, Zañalla Co., Texas, April 29, W. D. Hunter and F. C. Pratt, 1 ♀.

Gregory, Texas, May 30, 1910, W. D. Pierce, 1 ♀.

Devil's River, Texas, May 5, 1907. On sumach, F. C. Bishopp, 1 ♂.

Kennedy, Texas, April 5, 1896. C. L. Marlatt, 1 ♀.

Another specimen from San Diego, Texas, April 25, E. A. Schwarz in teneral condition, possibly is this species. All of the above are in the National Museum collection.

***Paracalocoris acceptus* n. sp.**

Length 6 mm.; length of thorax 1.26 mm.; width of thorax: front .53 mm., back 1.46 mm.; length of antennal joints: first 1.16 mm., second 2.4 mm., third .96 mm., fourth .86 mm.

Head cream color, eyes straw blotched with piceous; first antennal joint blotched with piceous and cream, second fusco-piceous with indistinct cream annulus a little nearer base than apex, third and fourth joints paler, each with a pale ring at base. Pilosity piceous on first joint, fading to white on terminal joints.

Anterior part of thorax and cuneus pale cream color, ground color of remainder of upper surface stramineous, sparsely irrorate with fuscous, the irrorations on thorax and about cuneus varying to fusco-piceous. A complete longitudinal line of this color just below lateral margin of thorax, and one traversing anterior half of thorax just above the margin. Hemelytra lightly margined with fusco-piceous. Membrane fumose, with paler areas paralleling the vein.

Legs stramineous; femora irrorate with fuscous; tibiae irrorate, but the markings tending to be grouped in four dark annuli, bounding three pale ones; tarsi stramineous basally, fuscous apically.

Under surface stramineous varying to cream, an indistinct fuscous markings across sides of meso- and meta-thorax above coxæ.

Camping place about 3 miles south of San Augustine Ranch, east side of Organ Mountains, New Mexico, August 28, 1894. At light. 1♂ Type, T. D. A. Cockerell (H.). Full data kindly furnished by Professor Cockerell.

***Paracalocoris deleticus* Reuter.**

Paracalocoris deleticus Reuter. Uhler ms. Nearktische Capsiden. Acta Soc. Sci. Fennicæ, 36, No. 2, 1909, p. 40. (Lamar, Colo., October 9, 1898, Van Duzee).

Length 6.5-7.5 mm.; length of thorax 1.6-1.66 mm.; width of thorax: front .9-1 mm., back 2.3-2.5 mm.; length of antennal joints: first 1.2-1.23 mm., second 2.3-2.4 mm., third 1-1.06 mm., fourth .83-1.06 mm.

Upper surface polished, with few hairs, except hemelytra, which have numerous inconspicuous short hairs. Ground color stramineous to cream color; herring bone pattern very faintly indicated on head, eyes piceous. Antennæ rufo-testaceous, a little tinged with fuscous near tips of last three joints; last two joints paler near base.

Thorax with faint fuscous to fusco-piceous irrorations near hind margin. Scutellum with one or two faint patches of same color near base. One specimen has a faint orange red patch each side of median line of scutellum near base. Fuscous to fusco-piceous vittæ dotted with ground color, located as follows on hemelytra: One on clavus, and two on corium over the terminal portions of cubital and brachial veins. Faint fuscous clouding along suture between clavus and corium and sometimes elsewhere. Cuneus orange red. Membrane hyaline with faint dusky clouding.

Femora slightly sprinkled or irrorate with usually dark color toward apices; tibiae slightly dotted, and tarsi darker apically. Scattered dark points or dashes along sides of thorax and abdominal segments.

Clarendon, Texas, September 19, 1905. On sagebrush (*Artemisia filifolia*). W. D. Pierce, 1 ♂, 2 ♀.

Mesilla, N. Mex., June 15, on flowerhead of *Dalea lanosa* (*Parosela lanata*?), T. D. A. Cockerell. 1 ♀. All in National Museum collection.